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The Trade Review.

A JOURNAL OF MANUFACTURES, COMMERCE, INDUSTRY, SCIENCE, ART AND INVENTION.

Vol. XIV.—No 28. CLEVELAND, JULY 9, 1881. No. 701

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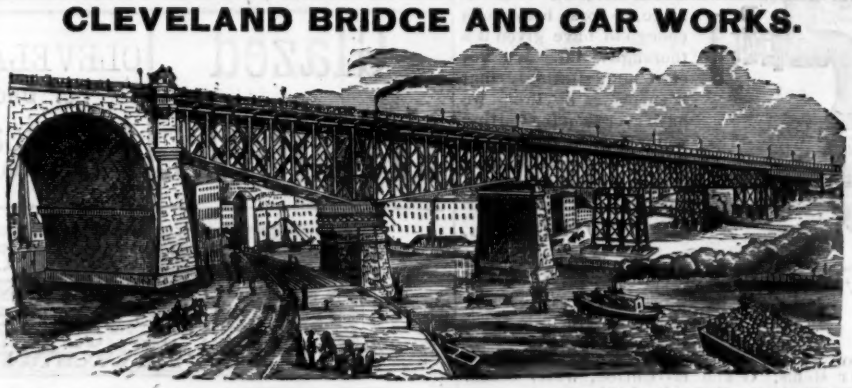

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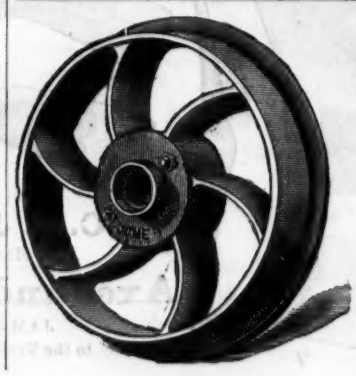

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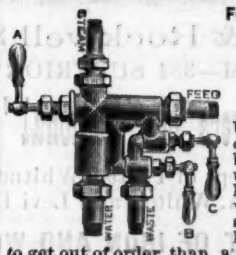

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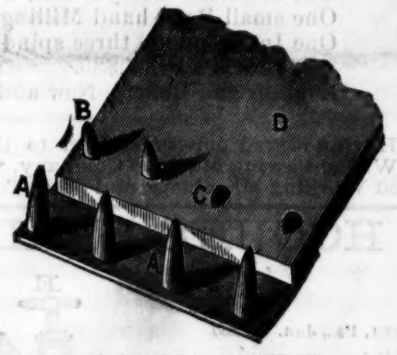

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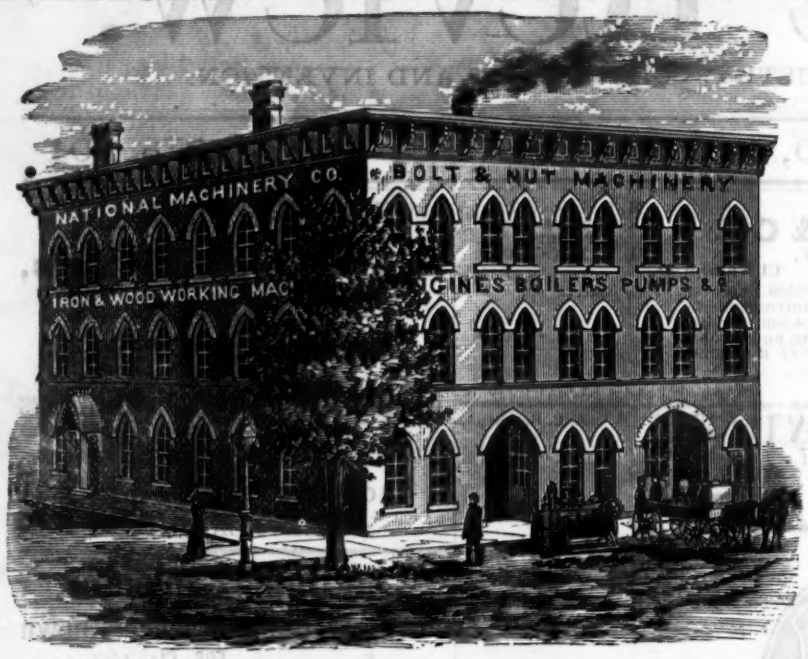

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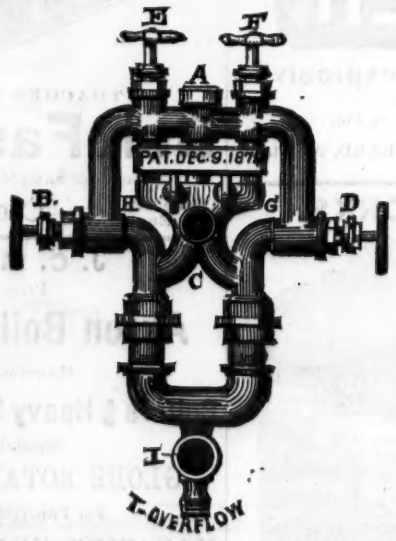

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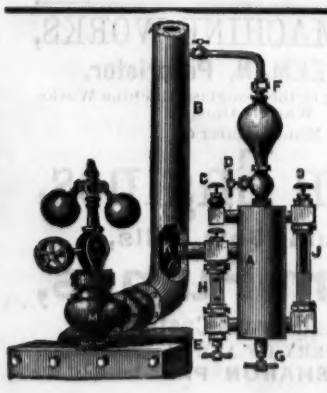

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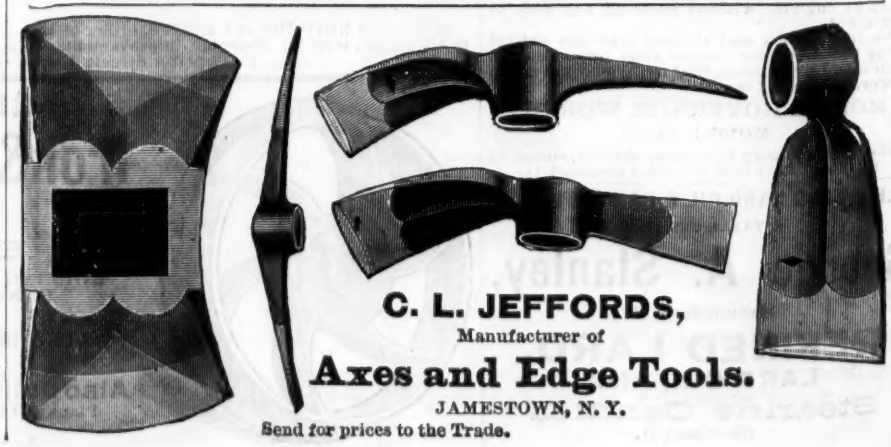

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FOURTEENTH YEAR.

The only strictly Manufacturing, Industrial and Scientific Paper published in Ohio.

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OF THE
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IRON MANUFACTURE OF NORTHERN OHIO AND THE CLEVELAND IRON TRADE.

The week has witnessed large arrivals of ore, and deliveries are gradually approximating to the figures reached in the corresponding period of last year. A good portion of the ore received has been shipped to the interior as soon as delivered. We quote Lake Superior:

No. 1 Specular, Bessemer quality	$9 00@10 00
No. 1 Magnetic, Bessemer quality	9 50@10 00
No. 1 Hematite, Bessemer quality	6 25@ 6 50
No. 1 Specular, mill ores	9 00@ 9 25
No. 1 Magnetic, mill ores	8 75@ 9 00
No. 1 Hematite, mill ores	6 00@ 6 50
Menominee Range ores	6 00@ 9 00

Our furnace men are more hopeful of the future, but incline to regard the prices of ore as too high, in view of the extent of competition with foreign iron, the shipments of which to this country are steadily increasing. More attention than ever is now likely to be given to the de-phosphorization process, by which low grade ores may be profitably treated. Additional orders have been accepted at a slight advance over current quotations. There is not much likelihood for the present of any large reduction in the make of iron in this State. The following are the Cleveland rates of

CHARCOAL PIG IRON.

No. 1 Lake Superior Charcoal	$31 00 @ 32 00
No. 2 Lake Superior Charcoal	31 00 @ 33 00
No. 3 Lake Superior Charcoal	32 50 @ 34 50
No. 4 Lake Superior Charcoal	33 00 @ 34 50
Nos. 5 and 6 Lake Superior Charcoal	31 00 @ 33 00
Nos. 1, 2, 3, 4, 5 Salisbury	42 00 @ 45 00
Nos. 1, 2, 3, 4, 5 Tennessee cold blast	38 00 @ 40 00

BITUMINOUS AND COKE IRON.

No. 1 Foundry from Lake Superior ores	$25 00
No. 2 Foundry from Lake Superior ores	24 50
No. 1 Foundry from Lake Superior ores with cinder mixture	23 50
No. 2 Foundry from Lake Superior ores, with cinder mixture	23 00
No. 1 Foundry from native Ohio ores	22 50
No. 2 Foundry from native Ohio ores	21 00 @ 22 50
No. 1 Silvery Foundry, native Ohio ores	21 00
No. 2 Silvery Foundry, native Ohio ores	20 00
No. 1 Gray Forge from Lake Superior ores	25 00
No. 1 Gray Forge, mixture of ores	20 50 @ 22 00
White and Mottled Forge Iron	19 00

The trade in pig iron has been more brisk, and the extent of the requirements of consumers augurs strongly for an advance in prices. Owing to the steady demand that has been going on, accumulated stocks are by no means large. The continued strike at Cincinnati is of no slight concern to all interested in the iron trade in this State. The effect is becoming more serious in the necessitated abandonment by the Cincinnati manufacturers of additional contracts, and the loss of new orders from their customers. It is believed that the strike is weakening, but the terms of advance demanded by the men, so much in excess of wages given at Pittsburgh, appear to preclude the possibility of early adjustment. The steel manufacture and trade continues steady. Scrap iron is quiet. The demand for plate, tank, and sheet iron is firm, and sales indicate improving prices. The bolt and nut manufactories in this city are as busy as ever. There is a larger production of these articles here than in any other city in the Union. The machine shops throughout Cleveland have all they can do to meet orders.

USE AND PRICES OF STEEL.

It is evident that a far vaster expansion in the application of steel as a substitute for iron would take place did prices somewhat more closely approximate those of manufactured iron; but as to large structures, such as light houses, railway bridges and vessels, the saving in weight or amount of material is such as not only to counterbalance this difference but to afford a percentage of saving varying from 9 to 13 per cent. At present our steel manufacturers have all they can do, but when their facilities are more extended they may find it to their advantage to abate their rates, which even then, as allowed on all hands, would afford a good profit. The opinion now prevails that a considerable reduction in the price of steel may soon be obtained. In an address lately delivered by Mr. William Denny of Dunbarton, Scotland, before the British Iron and Steel Institute, he observes: "My "own opinion regarding the price of steel is that "it must steadily lower until it reaches an equality "with the price of iron. I am led to this conclu- "sion not only by the fact that such a lowering of "price has taken place in the case of steel rails as "compared with iron rails, but also because I am "told the methods of steel manufacture are capa- "ble of more economical development than the "system of puddling employed in making iron. "It may, of course, be answered that the amount "of testing and the careful record required to be "kept by the steel maker of the nature of his ma- "terial and its character as it passes through the "different processes, involve a considerable amount "of expense not thrown upon the iron manufac- "turer. No doubt this objection has relevancy, "but as the difficulty involved in it is to a great "extent one of organization, I believe that it will "be overcome with much less expense than is at "present anticipated. There is a great fear on the "part of many manufacturers of such an organiza- "tion as will be required for the careful and suc- "cessful manufacture of steel for ship building "and boiler making purposes. They have no oc- "casion whatever to fear if they will only regard "such organization in a proper light, as a thing "which is to be perfected day by day and month "by month. The evil to be guarded against is "the assumption that an organization once set "down is fixed and perfect. Such a view is an "indolent and dangerous one; but if we admit the "truth that organization must be subject to the "same law of progress as the changes in manufac- "ture, all that will happen will be a greatly in- "creased amount of testing of a more crucial "nature than at present, leading manufacturers "to be more critical of their own productions." We agree with Mr. Denny that a moderate cost of production combined with excellence of quality, is the whole secret of the future of steel.

TRADE AND MANUFACTURES.

The general condition of trade is highly satisfactory. The decline in the price of grain, consequent on the certainty of a larger crop than had been anticipated, has given an impulse to the forwarding movement, and large shipments are going on by water and rail at moderate rates. The wool market is active and prices realized for Ohio wool are higher than hitherto ruled, and such as to satisfy our wool growers who have lately got through their shearing. There is a lull in the drygoods trade, but transactions for the season have been extremely large, the general prosperity affording the means to consumers of more extended purchases. Our Ohio textile mills are running full time. The lumber trade, as will be seen by our report elsewhere, shows unwonted activity. Manufacturers in shelf and hardware goods have run to their full capacity, and jobbers are doing an excellent trade though competition is sharp and the margins of profit narrow. Cleveland is not remarkable for the extent of its furniture manufacture, but the volume of business in the sale of furniture is daily augmenting. The boot and shoe trade continues lively. When will Cleveland cease to import the bulk of goods in this line from the East and manufacture for herself and the West generally? As to manufactures, foundries show increased business. All the engineering trades are active, and the demand for skilled mechanics and engineers cannot be supplied. Boiler and tank requirements have apparently no limit. The nut and bolt works of Cleveland and elsewhere are operating to their fullest capacity. The galvanizing trade is very brisk, as it has been all the year. Wire, too, is in improved demand, encouraged by the lowness of prices. The trade in nickel plating is extremely busy. A continuance of this state of things is confidently looked forward to. New manufacturing enterprises are springing up in Cleveland—a healthful sign.

NEW MOTORS.

Continuing our remarks on new motors, we have to observe that atmospheric engines working by heated air have now been so simplified that they find a ready adoption where moderate or intermittent power only is required. A gas burner suffices to impart the necessary heat, the hot air forcing up the piston by its expansive force. The improved engine has the merit of working noiselessly, whereas that shown at the Paris exhibition some twenty years ago, gave forth a direful groaning with every stroke of the piston, a "mournful agony" revolting to the ear as coming from insensate materials. Erricson's early efforts failed owing to a too complicated apparatus, the air passing through a red hot netting of wire; so that cylinder and piston presently became heated and therefore inoperative. In the progress of most inventions we find inventors at the outset burdened with details which presently are set aside. In the endeavors to obtain an effective and economic motor applicable to light running machinery by means of a vacuum, so as to utilize the pressure of the surrounding air, no really great practical success has been achieved, and for the reason that on this plan there is a loss of power in getting up the vacuum in the tube, the resistance increasing in a rapid ratio. During the expulsive strokes of the piston of the air pump, that is when the air that has been drawn from the main is expelled into the atmosphere, a considerable quantity of heat is evolved by the process, increasing beyond what theory would assign, the resistance to the motion of the air piston. The modifications that have been introduced into the atmospheric engine, working by compressed air, without a vacuum, for the purpose of producing mechanical force, and communicating that force for driving machinery, render it fully available at length as an economic motor, and this form of motor is securing a wide range of use. A vessel is made sufficiently strong to withstand a very high pressure, into which air is forced by means of

pumps; a chamber is placed contiguous to the receiver, into which the compressed air is admitted before it passes to the working cylinder in order to reduce its density and determine its elastic force, which is regulated by a spring valve set to the power required, or by governor or other contrivance. The impelling of engines by the explosive power of gas is an idea originated some years since, but at the European exhibitions the engines shown were merely looked on as curious but unutilizable. Latterly the method has been satisfactorily worked out, and gas engines are manifestly destined to find their place as useful motors. This result is being brought about as much by certain negative as positive qualities, as in their greater cleanliness as compared with engines, the little space occupied, generation of but slight heat and simplicity of construction. The announcement that three of the largest gas engines yet made will operate the large grain elevator of St. Louis, and in fact are now being placed in the cupola of the structure, has come upon the mechanical world like a surprise, and will cause much attention to be directed to their working. If successful, we may anticipate that gas engines will find place in various elevators owing to the advantages we have enumerated.

AMERICAN TRADE WITH FOREIGN COUNTRIES.

Consul Foote of Valparaiso writing of the trade between Chili and the United States mentions that two-thirds of the American goods now sold in Chili are the importations of English and German houses, and more, that they are only imported to supply an actual demand. He thinks that investigation will show that every one of our business houses in the South American States is the result of some small venture, and that when the founders of such enterprises have retired, oftentimes with large fortunes, the business has either ceased or passed into foreign hands. The real causes, in our view, are the greater shipping facilities possessed by Europeans, civil disturbances and the late war. The scope for home enterprise is so wide to our merchants, that they do not feel called on to run heavy risks, or operate at a disadvantage. Consul Brooks, of Cork, affirms that the English have a great advantage over us in the matter of iron sailing ships, iron vessels having the preference, commanding a higher freight and securing lower insurance rates. There is evidently an opening for us in the Dutch West Indies for which our cotton goods and other textiles are laying the foundation. The report from Amsterdam furnishes serviceable specific information as to the pork products in demand. There is a marked increase in the Netherlands of the consumption of American tobacco, the price of which is ruled absolutely by the American market.

It is almost laughable to speak of our trade with Egypt, for most of the American goods that reach that country come via England, and are entered as English imports. It is seldom that the American flag is seen in the Orient, and this chiefly when one of our vessels making its circuit of the Mediterranean calls at Alexandria. The nation, as a body, favors protection for manufacturing and industrial interests, why not for our shipping? An allowed duty of our Government is to protect its commerce, but with all our wealth, power and extent of territory, legislation has not favored our ships and shipping interests. Freight by indirect transportation is too great to enable us to compete with Europe in the Orient. No wonder that there is a want of adaptation in our goods for the Egyptian market, as General-Consul Forman at Alexandria writes, when, if ever so adapted, they must reach there at so complete a disadvantage. Still, with "proper management,"—in other words, attention to styles, he believes that "many more American goods could be sold in the Orient, both to Europeans and natives. He observes: "A gentleman of my acquaintance sent to the interior of New York for a quantity of glassware, which was packed in barrels and sent him. It arrived in good condition, but the freights amounted to four-fifths as much as the first cost. The glass was good and still cheap enough to sell at a fair advance, but it was not of the style of that which comes from Europe and is in use here, and therefore could not be sold to advantage. It is the same with cotton cloths." European mercantile houses have agents who reside in Egypt or are sent out from time to time to make the circuit of the eastern cities and learn the wants of the native merchants and supply them so far as is possible. Our different mode of doing business as regards credits is also in our way. The imports from the United States into Egypt last year amounted only to $362,-650; and exports to the United States to $99,610. It is evident from what other nations are doing that though Egypt has little to send us, a large export trade from this country could be carried on with it under more auspicious circumstances.

THE CONSTRUCTION OF GAS METERS.

The inefficiency represented in the allowed inaccuracy of gas meters is a standing subject of dissatisfaction to gas consumers, and a great service would be done to the community at large by the production of such a gas meter as all could have faith in. The weight and volume of nearly everything else can be obtained except that of this most indispensable material which has to be measured while in movement. It is not our office to write a treatise on gas meters, but simply to indicate a direction for mechanic and scientific effort in which success would bring a rich reward. The gas companies are far from being enthusiastic on the point of the improvement of meters. They profit in fact by the inefficiency of these instruments, for just in the degree of defectiveness will the charge for the passage of gas be increased. Just as no one complains of the small amount of their gas bills, so no gas company complains, bad as its meters may be, that these do not keep up to consumption. A gas meter if bad is recklessly bad; is apt to run ahead with exaggerated reckoning, as if delighting in lying indicators. Any invention, even without being perfect in itself, by which gas could be more accurately measured than at present is a desideratum. That there is a certain amount of leakage through the pores of metal of which mains and pipes are composed is undeniable, but this loss falls on the companies; whereas what is complained of by consumers is the being charged for gas that is never burned, which has not escaped, but the passage of which is wrongly recorded in defective meters. We know that every inventor of a gas meter is ready to take oath if necessary that his article is perfect, but assertion is now-a-days at a discount; nothing will satisfy the public but positive proof. There is less of complaint than formerly by gas companies of their customers adopting fraudulent methods to reduce the record. The latest gas meters invented provide special means for preventing this or for insuring protection; and it is remarkable how few cases of late years have transpired of individuals fraudulently securing a supply from pipes or mains. In the case of wet meters, care is taken by gas companies that they shall be placed in positions where they shall not freeze. Dry meters, however, are those generally adopted. We content ourselves with simply calling attention to the subject; inventive genius—we obtain the simile from Fourth of July corruscations—has simply to be touched with a spark to come out magnificently.

AT last a court at New Orleans has decided, contrary to the ruling of the Treasury, that cotton ties imported to this country are subject to the same specific duty as hoop iron. The decision will be appealed against, and it will be interesting to have the judgment of the Supreme Court on the matter. Iron manufacturers are better fortified with arguments than ever against the views of Assistant Secretary French.

WE would call attention to a remarkable letter in our correspondence, in which a theory is put forward as accounting for telephonic communication, by the fibrous character of the air.

MANUFACTURES.

TO MACHINISTS, MANUFACTURERS AND OTHERS.

THE publishers of THE TRADE REVIEW solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinist and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own language, as all such contributions will be properly revised before sendin to press.

OHIO.

THE Woolen Factory of Crowther Bros., Kingsville, is to be stocked and stocking yarn manufactured.

"RUSSIA Leather Works" are about to be established at Ashtabula, with J. R. McKay as manager.—*Cleveland Herald.*

THE new Wrought Iron Fence Manufacturing Company, Kingsville, are getting out some very nice work and at very favorable prices.

A CONFLAGRATION at Mansfield on the 4th ult. destroyed the sash and door factory which was full of finished work and new machinery. Loss heavy; insurance not over $25,000.

THE Smith Bridge Company, of Toledo, has just finished a Howe truss bridge for the Cincinnati, Wabash & Michigan Road, over the Mississenewa River at Marion, Ind. There are two spans of 140 feet each.

THE mill at Norwalk, formerly owned by Goodnow & Warner, and which has been idle for about a year, commenced running again last week, and will be kept going by its present owner, Theodore Williams.

THE car shops of the Wabash, St. Louis & Pacific Company, at Toledo, are now employing 400 men. The work in hand consists of 300 stock, 300 twenty-ton coal, 15 baggage, and 2 pile-driver cars. They are also having 3 dining cars built at Dayton.

THE Speed Recorder Co., Kent, lately shipped 21 machines, one of which went to Derby, England. The machines are being successfully introduced in Europe. The company have received an order for casting 300 coal car wheels for coal companies at Akron.

A COMPANY embracing some of the best business men and capitalists of Cincinnati has been organized under the name of the American Iridium Company, with a subscribed capital of $240,000, for buying, manufacturing and selling iridium.—*American Manufacturer.*

THE Cleveland Rolling Mill Company are putting up 250 additional coke ovens at Moyer, Westmoreland county, Pa.—*Ibid.*

THE Butman Furnace Company, on Michigan street, Cleveland, are driving a most successful business. Though only in business since January orders have continuously poured in, and they contemplate shortly erecting commodious buildings, when they will employ a much larger force.

W. J. CLARK & Co., Salem, are putting into their works the second large power cutting machine for cutting blanks from heavy plate and sheet iron to be stamped into elevator buckets. Their "Salem" bucket is being put to use in coal mines, iron minea, iron furnaces, &c., as well as in grain mills and grain elevators, and is found to be well adapted to such work.

NEW boilers have been put in at the Akron Company's Rolling Mill, Akron.

THE following companies have been incorporated at Columbus: The Removable Blank Cover Company, Cincinnati; capital, $50,000. The Youngstown Glass Roofing Company; capital, $10,000. The Queen City Forging Company, Cincinnati; capital, $50,000. The Champion Sewing Machine Company, of Hamilton; capital $100,000.

THE ambitious and flourishing little city of Springfield is on the high tide of prosperity. The new Champion Works, now in course of construction, will be the largest of the kind in the world. A large factory has just been completed for building velocipedes. Mast, Foot & Co. have added largely to their works to facilitate the manufacturing of ornamental iron fences.—*Chicago Industrial World.*

THE Andrews mill, Hazleton, has started and is at work. The buildings are large, the one in which the train of rolls is located being 120x90, and the puddle mill 225x90 feet. There are six double puddling furnaces.—*Ibid.*

F. I. FREEMAN, lessee of the Douglass machine shops, Warren, which were destroyed by fire several weeks ago, has decided to build a large machine shop on lands belonging to the S. L. Freeman estate and lying just north of the New York, Pennsylvania & Ohio Railroad. The machine shop will be of frame, 100x50, with an iron roof. Mr. Freeman will also construct a foundry of the same dimensions.—*Cleveland Herald.*

THE Artificial Stone Works, of Palmer & Pruner, 203 N. Howard street, Akron, are doing a fine trade. Their designs are marked by both originality and taste. Their ornamental lawn vases are exceedingly rich in effect, and their fountain basins most attractive. Their cemetery work is a relief from dull, conventional styles. Their mosaic pavements, in various styles, are suited to halls, conservatories, &c., and rival the best Italian work. Architects and builders would do well to examine their window-caps, sills, and keys.

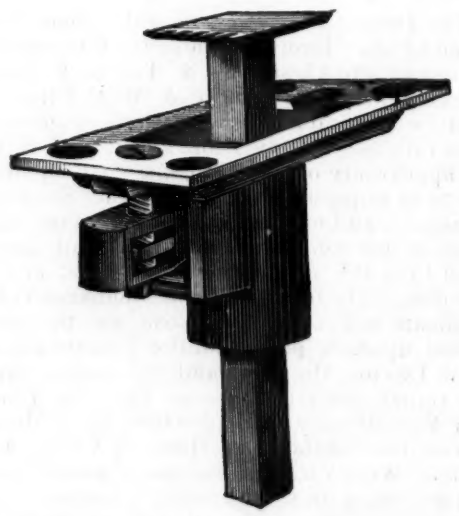
A CORRESPONDENT of the New York *American Protectionist* writing on the pottery manufacture in the United States, says of East Liverpool, O.: "This city is the ceramic centre of the West as Trenton is of the East, and possesses the advantages of proximity to the clays of Ohio, Indiana, and Missouri, and to an abundant supply of fuel. For about thirty years it has been largely engaged in producing ordinary yellow and Rockingham ware. Scarcely any white ware was produced at this place until the year 1873, since which period its fifteen establishments have manufactured white granite, cream-colored, and semi-china, as well as Rockingham ware, to the extent indicated in the official statement presented in another column."

IN accordance with the resolution adopted by the National Window Glass Association at their late meeting at Chicago, most of the window glass factories of Ohio shut down from the 1st of July to which time the privilege was extended from June 1, "if they did so at a reduction of 20 per cent in the price of labor." Several manufacturers who had enough orders on hand to keep them busy for one month longer made a "kick" against the latter clause of the resolution, and determined to run their factories; and as any attempt on their part to make a reduction in wages would cause a strike, and as the firms had contracts with their men for wages up to July 1st, they concluded to keep running until that time; but the general impression was that they would close down on that date. Prominent manufacturers state that the general impression is that all factories will be closed until the 1st of September. Several manufacturers, however, arranged with their men to run this last week, as they have several large orders and stock is short. In regard to the proposition for a reduction of 20 per cent. in wages when work is resumed in September, it is not definitely known what action will be taken. That something must be done is the universal confession among the manufacturers, if the market does not mend. The old matter of having to contend with foreign importations still exerts an influence. The matter was laid over until September, when it is to be hoped that the trade will then be in such a condition as to render such a step unnecessary. The bottle manufacturers as a rule are glad to shut down, as their busiest season for the present is over. The greater number of the pressed factories will run all summer, as the manufacturers have enough orders on hand or in prospect to keep them running, and the men are disposed to make the extra money, and do not want to lie idle. The present ware trade is very fair and orders are plenty.

THE advantages of Toledo as a manufacturing and trading center are thus set forth by a correspondent of the *Boston Journal of Commerce*: The city of Toledo is situated at the extreme southwesterly end of Lake Erie and near the centre line of population of the United States between the east and the west. Its rapid growth and present population, now about 60,000, is due mainly to the commercial advantages which it possesses. Owing to the lack of cheap coal for fuel, the source of power by steam, manufacturing has heretofore been slow to lend its aid. The completion of competing railroad lines direct to the coal fields has secured this important requisite, cheap coal, in great abundance. This introduces a new era in the history of Toledo as a manufacturing point. The city is surrounded by forests of the most valuable hard wood, has easy access by water to the pineries of Michigan and the iron ores of Lake Superior; and lumber, hides, wool and iron ore, cotton, grain, and other products of the soil are piled upon her docks or in her warehouses for distribution to other points, being the greatest wheat market in the country, and droves and herds of fat cattle, hogs and sheep near at hand. Toledo, with these facilities for raw material, with all the products of the soil plentiful and cheap, making cheap living and consequently cheap labor, and now, with cheap power added, with means of transportation by the lake, canals, and sixteen lines of railroad for the distribution of manufactured articles, furnishes advantages for the profitable use of capital in manufacturing.

IMPROVED SPOKE SAW AND TENONING MACHINE.

The Mason Spoke Saw and Tenoner, of which we present an illustration, and which is manufactured by the Mason Wheel Company, Crown Point, New York, has the merit of working accurately and with extreme expedition. It consists of a substantial iron frame upon which is mounted a movable carriage supporting a steel arbor with a dished saw for cutting off the spokes of the wheel as they are presented to it. In the center of this saw is an ingenious and perfect expansion augur formed from plain steel cutters with intermediate supports; this arrangement making a perfectly balanced cutting tool, producing a tenon of parallel diameter throughout, and leaving a clean, squarely



cut shoulder for the rim, the sawing off of the spoke and the cutting of the tenon being done with one and the same adjustment. The ease and rapidity of its execution are such that a good workman will saw the spokes and cut the tenons for one hundred sets of ordinary wheels in a day. It can be changed to cut any sized tenon by simply moving the cutting edges upon a gauge which cannot vary or become worn. By a rim boring attachment the augur is fed through the rim, thus reducing to a minimum the risk of splitting. The rim dressing attachment insures a perfect fitting of the tire.

THE Pennsylvania Company have decided to run a branch road from Alliance to Niles, O. The engineers are locating the route at once, to connect with the Ashtabula & Pittsburgh Road.

CORRESPONDENCE.

Why the Telephone Operates.

CLEVELAND, July 7, 1881.

To the Editor of the Trade Review:

SIR—Millions of people use the telephone without inquiring as to its principle, and none of the inventors of this mode of communication (for according to evidence there were several) or any of its adapters, have done anything to enlighten the public on the question. We have the fact that simpler telephones than the Bell are coming into operation which do not depend on electric induction, but on the communicative properties of the air itself. This circumstance confirms my theory. Most people are aware that the sound from scratching with a pin a piece of dry timber at one end can be heard distinctly at the other end. This results, I take it, from the fibrous character of the wood—a disturbance of connected particles. I conclude that it is the fibrous character of the atmosphere to which we are indebted for telephonic communication. The atmosphere, when pure, is composed of two gases, with the admixture of a small proportion of aqueous vapor and carbonic acid. Now, as the atmosphere is admitted to be a body, may we not suppose that it is constituted like other elastic bodies, though it cannot, like those that are solid, be brought within the sphere of microscopical investigation, and that this aqueous vapor is distributed throughout the atomic interstices in the form of an infinitely minute and symmetrically reticulated fibrous tissue, susceptible of tension and attenuation, like that known to exist in animal and vegetable substances? By such a supposed distribution of the aqueous vapor, an independent vehicle of sound is at once supplied, and the gaseous elements of the atmosphere are left to perform their wonderful and important duties in the economy of the creation undisturbed. The supposition which I have hazarded, will also satisfactorily account for the greater facility with which sound is transmitted in the lower regions of the atmosphere where the relative proportion of the aqueous vapour to that of the gaseous elements is greater than in its higher regions.

Yours truly, AN EXPERIMENTER.

Strength of Materials.

AKRON, O., July 5, 1880.

To the Editor of the Trade Review:

SIR—In this day of engineering and building the strength of materials becomes of increasing importance. It has to do not only with the capability of a structure to sustain the weight or strain to which it may be subjected, but also economy of material, a point not to be overlooked when competition is so strong. I will now venture to place before your readers some conclusions bearing on this subject, the result of extended investigations carried on in Europe and America, of which I have taken note. A piece of the best bar iron 1 square inch across the end will bear the weight of about 77,373 lbs. while a similar piece of cast iron will be torn asunder by a weight of from 16,243 to 19,464 lbs. Fuller recognition of this fact will show the great waste of iron in most of our old and many of our modern constructions. It is astonishing that wire has not been more extensively used for sustaining superincumbent weights. Iron wires, arranged parallel to each other, and presenting a surface at the extremity of 1 square inch, will carry a mean weight of 126,340 lbs. Then as to proportions which concern the matter of form. Theoretical investigations and actual experiments alike lead to this result. In a parallellopedon of uniform thickness, supported on two points and loaded in the middle, the lateral strength is directly as the product of the breadth to the square inch of the depth and inversely as the length. I will conclude with a list of the weights required to crush some of the most important materials, extracted from Eytelwein's Handbuch der Statik fester Korper 2r. Bd. 1. Metals, 115813—177,776 lbs. on the square inch; Cast iron, 164,864 lbs.; Copper, molten, 11,088 lbs.; Copper, hammered, 103,040 lbs.; Tin, molten, 15,456 lbs.; Lead, molten, 7,728 lbs. F. B.

A VERY determined effort is being made to connect the ore fields of West Virginia with Pittsburgh via the Monongahela Valley.

MECHANICAL RECEIPTS AND ITEMS.

CASE HARDENING.—Joshua Rose, M. E., observes in the New York *Blacksmith and Wheelwright:* Box hardening consists in packing the articles in a box, inclosing the case-hardening materials. The box is made air-tight by having its seams well luted with fire-clay. The case-hardening material most commonly used is bone dust, a layer of which is first spread over the bottom of the box. A layer of the pieces to be hardened is then placed in the box, care being taken to so place them that when the bone dust is consumed the weight of the uppermost pieces will not be likely to bend the pieces below them, or to bend of their own weight; and it follows that the heaviest pieces should be placed in the bottom of the box. A better material, however, is composed of leather and hoof, cut into pieces of about an inch in size, adding three layers of salt, the proportions being about four pounds of salt to twenty pounds of leather and fifteen pounds of hoofs, adding about one gallon of urine after the box is packed. The box lid should be fastened down and well luted with fire-clay. It is then placed in a furnace and maintained at a red heat for twelve hours, when the articles are taken out and immersed in water, care being taken to put them in the water endways to avoid warping them. Articles to be case-hardened in the above manner should have pieces of sheet iron fitted in them in all parts where they are required to fit well and are difficult to bend when cold.

HARDENING IN OIL.—A correspondent of the *Blacksmith and Wheelwright* observes on this subject: I have made and tempered cutters for straight and irregular molder's sash tools, etc. If tempered in oil they will hold their edges better, cut smoother, and wear longer than if tempered in water. In hardening the oil cleaves to the steel, which is in consequence longer cooling. The water seems to separate, leaving air spaces between the steel and the water. Water cools quicker and hardens harder than oil and consequently steel hardened in oil must be left at a higher color than when hardened in water. A good deal depends on the heating of the steel to get a good temper. While water injures the quality of the steel, oil improves it.

BREAKAGE OF HEAVY STEEL AXLES.—A correspondent of the New York *Blacksmith and Wheelwright* writes: The colder steel is, the more brittle it is. Indeed, in point of fact, steel or wrought iron is at its strongest at about 430 degrees of heat, as was proved by some experiments made by the United States government about twenty years ago, and since repeated by Fairbairn (I believe), who quotes facts and figures in his published works on boilers. Steel is very apt to crack or break from a sudden jar at a low temperature.

SILVERING MIXTURE.—A German scientific journal furnishes a process for the instantaneous coating of copper or brass objects with silver without difficulty: Mix 3 parts of chloride of silver with 20 parts of powdered cream of tartar and 15 parts of powdered common salt. Moisten a suitable quantity of the mixture with water, and rub it with a piece of blotting paper upon the metallic object, which must be thoroughly clean. The latter is afterwards rubbed with a piece of cotton upon which precipitated chalk is dusted, then washed with water and polished with a dry cloth.

HOW TO MAKE DOMESTIC GRAPE WINE.—Take twenty pounds of ripe, fresh picked, and well-selected grapes into a stone jar, and pour on them six quarts of boiling water. When the water has cooled enough, squeeze the grapes well with the hand; cover the jar with a cloth, and let it stand for three days; then press out the juice and add ten pounds of crushed sugar. After it has stood for a week, scum, strain, and bottle it, corking loosely. When the fermentation is complete, strain it again and bottle it, corking tightly. Lay the bottles on their side in a cool place.

TUNNELING A VOLCANO.—At the Bankspeninsula, east of the town of Christchurch, New Zealand, is an extinct volcano, the structure of which has been made visible by a tunnel of 2,620 metres' length upon the railway between Christchurch and Littleton, a structure formed by successive streams of lava and beds of scoriæ, ashes, and turfæ, which are again intersected by dykes of younger volcanic rocks. This is perhaps the first volcano through which a railway has been constructed.

RAILROADS AND TRAFFIC.

AN underground railroad has been actually commenced at New York. It will be a costly undertaking. The Metropolitan Underground Railway, of London, cost $3,000,000 per mile.

UNDER the title of the Richmond, Allegheny & Ohio Railroad, the stockholders of the Richmond & Allegheny, Atlantic & Western and Ohio Central Railroads have voted to consolidate to form a continuous road between Richmond and Toledo.—*Chicago Railway Age.*

PRELIMINARY surveys for the Pittsburgh, Cincinnati & St. Louis Road have been completed for the branch from Red Bank, seven miles north of Cincinnati, to Richmond, 76¼ miles. The proposed road is intended to give a nearly air line road from Chicago to Cincinnati via Logansport and Kokomo.—*Ibid.*

THE London *Times*, in pointing out the advantages of an electric railway, in which a dynamo machine is placed underneath the car and transmits its movement to the wheels by spiral steel springs, observes: Several carriages, each with a dynamo machine, can be joined to one train, and by this distribution of motive power much steeper inclines can be overcome than when the same train is drawn by a single locomotive. In addition to the ordinary brakes, means can be provided to short circuit the machines on the carriages, and to cause them to act as very powerful brakes. The use of large stationary engines reduces the amount of fuel necessary to develop a certain power on the traveling carriages, and if waterfalls can be utilized the cost of working these railways can be further diminished. It seems probable that such railways can be usefully and economically constructed to facilitate the traffic in crowded streets, or in situations where local circumstances favor their application. On an electrical railway, it may be explained, one rail is used as the positive, the other as the negative conductor.

AMONG the new securities added to the New York stock list is the Chesapeake & Ohio Railroad.

THE amount required for the St. Lawrence Railway tunnel is $400,000.

THE monster steamer Great Eastern is to be sold at public auction. It is just too big for anything.

THE cost of the New York and Brooklyn Bridge, on which $13,000,000 has been spent, and for which another million is asked, would construct and equip over 600 miles of railway, at an average of $23,000 per mile.—*Chicago Railway Age.*

THE Detroit *Free Press* considers that the action taken by the Cleveland syndicate for securing the control of the Columbus & Toledo, Columbus & Hocking Valley and Ohio & West Virginia railroads, will in its consummation be more than a mere railroad consolidation, and it has very much the appearance of the birth of a coal monopoly, rivaling in importance and power the Standard Oil monopoly, and only second to it because the coal fields of this continent are larger and more scattered than the oil-producing regions, and therefore difficult to bring under one management. This syndicate will control, as soon as the sale, now agreed upon, is perfected, the Cincinnati, Hamilton & Dayton, the Cleveland, Columbus, Cincinnati & Indianapolis (known as the Bee Line), the New York Pennsylvania & Ohio, the Columbus & Toledo, the Columbus & Hocking Valley, and the Ohio & West Virginia railroads, which combination will place in their hands all entrance to Cincinnati from the north and east, except by way of the Pan Handle and the Baltimore & Ohio, which comes in by the Marietta line. It also gives them a firm grasp on all communication between Detroit and Toledo, and the south and southeast, except by the Ohio Central Road. The coal interest purchased by the syndicate comprises a majority of the coal mines in the Hocking Valley and insures complete control of all, as no coal from that region can find any market except by the railways named, always excepting such as can be shipped by boats on the Ohio River. Now, the Ohio Central Railroad & Coal Company own the coal fields on the other side of the ridge in which the Hocking mines are found, and owning the coal and the road as well, has been able to undersell the Hocking Valley men, and in the matter of freight, to cut under the roads just sold. With this control the syndicate can force the Ohio Central people to come to their terms, can undersell, or crush them out. The extensions, whilst giving increased power to the consolidated companies, will prove a positive prohibition of the contemplated southeastern extension of the Ohio Central, which has already been decided upon, but which now will probably never be built. This extension was to run to Pomeroy, on the Ohio River, and thence across the mountains to meet and consolidate with the Richmond & Allegheny Railroad now building. It would have been an expensive line to construct, but would have opened the mines of the company to the Richmond & Chesapeake Bay market, but the new combination has only to build sixty miles, as already mentioned in the *Free Press*, from Gallipolis to Charleston, W. Va., to complete a shorter line to Richmond than the one proposed by the Ohio Central, giving, in fact, the shortest practicable route not only from the coal fields, but from Detroit and Toledo to Richmond, and all the territory tributary to that great city. The distances will be as follows: Detroit to Toledo, 60 miles; Toledo to Columbus, 124 miles; Columbus to Logan (C. & H.V.), 50 miles; Logan to Gallipolis (O. & W. Va.), 65 miles; Gallipolis (extension), 60 miles; Charleston to Richmond, 369 miles, making a total of 728 miles.

THE Santa Fe Road has arranged its difficulties with the Southern Pacific and freights to all points in New Mexico, Arizona, and Southern California, as well as to San Francisco, will be taken at old tariff rates.

THE Connotton Valley Railway having been completed to Bedford, regular trains are now running The road will probably be completed to this city by next Fall.

AN extension of eight and a half miles has been completed of the Cincinnati, Georgetown and Portsmouth Railroad to Bethel, Clermont county.

THE old company, operating the Alliance and Lake Erie narrow gauge railroad some time since, sold their stock to New York capitalists, who propose to extend the road southward to Waynesburg, O., and form a connection with the Connotton Valley road.

THE Wheeling & Lake Erie road is to be brought into Toledo.

THE Pittsburgh, Youngstown & Chicago Railroad Company of Ohio and the corporation of the same name organized under the laws of Pennsylvania, have filed copies of their articles of consolidation with the Ohio Secretary of State. The Ohio Division extends from Toledo, via Youngstown, to a point on the east line of the State, where the same is intersected by the abandoned Ohio and Pennsylvania Canal, and the Pennsylvania Division from thence to the City of Pittsburgh. Work is going on in the construction of both divisions. Each Company is put into the consolidated affair at $2,000,000, making a total capital of $4,000,000. Chauncey H. Andrews is President.

FAILURES IN 1881.—The roll of failures kept by Messrs. Dun, Wiman & Co., for the first six months of 1881 shows a falling off as compared with the same period last year, in the number of bankruptcies, but not in the aggregate amount involved. The number of failures has fallen from 2,862 to 2,497, and from 4,018 in 1879; but the total amount involved is $40,000,000, as compared with $33,000,000, in the first six months of last year, and $65,000,000 in the first half of 1879. Under ordinary circumstances, however, the number of bankruptcies is a better index of the condition of trade than the size of the failures, as the latter amount may be swelled by large and exceptional disasters not to be wholly ascribed to any cause having a general depressing influence on trade. The year 1881 therefore shows a marked improvement over 1880. The warnings given, however, against loose giving of credits and rash investments so apt to make their appearance when good times are regarded as being fairly established, and the speculative spirit rises to its full height, like the Arabian demon out of his prison-jar, are warnings which the wise men of commerce will heed.

A "NOAH'S Ark Race" was recently introduced at the recent Madras fair, and was a handicap for all animals bred in the country, the competitors including buffaloes, elephants, a goat, ram, emu, and elk, and other creatures. The buffaloes went at a good gallop but the ram was the winner, the horse coming in second.

Boiler Construction and Management of Furnace Combustion.

With the exception of sectional boilers, there are practically only two kinds of boilers, viz.—exterternally and internally fired. The externally fired boilers comprise, plain cylinder boilers, horizontal and vertical, two-flue boilers, horizontal,—three, four, five, and six flue boilers, horizontal, tubular boilers, horizontal.—compound tubular boilers, horizontal. The internally fired boilers comprise Cornish boilers, horizontal; Flue boilers, vertical; Tubular boilers, vertical; Locomotive boilers, horizontal. 1. Sectional Boilers: There are a variety of this class in use, producing excellent results. 2. Plain Cylinder Boilers: This is the most simple form of boiler made, desirable where coal is cheap, or in lumber regions, where sawdust or slabs are used as fuel. They are also extensively used at blast furnaces. 3. Flue Boilers: The transition from a cylinder to a flue boiler is a easy and natural one, and probably suggested itself as a means of utilizing the waste gasses, passing into the chimney. 4. Two-flue boilers are in very common use throughout the country and have given very fair results; sometimes the flues are decreased in diameter and increased in number. It is a common practice in some sections of the country to make a boiler with five flues, and at times with six and even more. 5. Horizontal Tubular Boilers: This type of boiler has had an extensive sale. There is quite a diversity of opinion in regard to proportioning tubular boilers. Casual observations made on the steaming capacity and temperature of escaping gases show that in tubular boilers having lengths of twelve, fourteen, and sixteen feet, and with ordinary slow firing, that the two former are to be preferred to the latter length for tubes three inches in diameter. If a force draft is employed then three inch tubes sixteen feet long may be used with advantage, if a damper is placed in the chimney so as to slightly increase the pressure of the gases flowing through the tubes. There has been a great demand in this country within a few years past for small internally fired vertical boilers: these are used for furnishing steam for small engines, pumps, heating, etc., and wherever used have proved as satisfactory as is possible for this style of boiler. Vertical tubular boiler is the form of boiler usually supplied with the numerous small vertical engines now offered in the market. When properly made, it is an economical boiler, and with proper management will be found to be quite durable in service.

After deciding which kind of a boiler is on the whole best adapted for a particular service, the question of boiler setting should then be carefully considered. There are all sorts of ideas as to how a boiler should be set; many of them are good, and quite as many more at variance with the actual requirements. Brick should be used throughout in the boiler setting, and is to be preferred to stone for the foundations. We now come to the construction of boiler furnaces. The great many kinds of fuel, the more important varieties including wood, peat, lignite, and coal, although they contain nearly the same ingredients, but in different proportions, render it a somewhat difficult task to define what a furnace should be. Hydrocarbons, such as pitch, tar, naptha, and petroleum, have all to pass into a gaseous state before they can be burned. Coke, which is coal, with all the bituminous and gaseous portion taken out of it, is nearly purely carbon, with a small proportion of ash. Anthracite coal, which is very similar in its nature to coke, is wholly composed of free carbon, with a mixture of hydrogen and oxygen. From this it will appear evident that special provision must be made for a supply of air to support combustion requisite for the different kinds of fuel used. Thus a furnace arranged for burning bituminous coal might be very wasteful in burning anthracite coal. Due regard, then, must be paid in all cases to the character of the fuel employed. The indispensable conditions attached to a good furnace for all kinds of fuel are: A good draught, which can be regulated at will, so as to avoid forcing the fire too much. A large and roomy combustion chamber, surrounded by fire bricks. That the sides or walls of a furnace have several thicknesses of bricks nearest the fire, and an outer wall having an air space between of about three inches. That the supply of air to the furnace can be regulated at will. The ordinary boiler furnace, as at present constructed, is very faulty, as about twenty-five per cent. is lost in obtaining a draught; when the products of combustion are flying off to the chimney at a speed of thirty feet in a second, in some instances, it must be abundantly clear that fifty per cent. of the heat of fuel we use is lost.

[TO BE CONTINUED.

ITEMS OF INTEREST.

THE sum of $500,000 has been subscribed for the Cincinnati Stockyard Company.

DURING the past four years 1,003,574,000 postal cards were issued by the Postoffice Department.

COINAGE at the United States mints during June was $6,029,500 gold; $2,413,770 silver, and $39,972 base coin.

THE population of the city of New York is estimated at 1,257,544, or 50,064 more than when the census was taken.

THE bullion value of the silver dollar is now a fraction over 86 cents. The rate of the coining now is about $2,300,000 a month.

THE bears on Lake Superior copper securities seem to be having a field day on 'Change, Boston, judging from late quotations.—*Houghton Mining Gazette.*

THE Baldwin Locomotive Works at Philadelphia are building a locomotive expected to make eighty miles an hour. It will be tested in England and on the continent.

A BIG fight is organizing against the Standard Oil Company. Many of the oil refinery firms and companies of Ohio, Pennsylvania, and New York are combining for mutual protection.

IN accordance with the resolution of the National Association of Stove Manufacturers, confirmed by the Western Stove Association, the price of stoves has been advaneed five per cent.

THE parade of eighty drays, laden with products representing the resources of Georgia and Alabama, which took place at Rome, Ga., on the Fourth, shows that the South is becoming alive to the importance of diversified industry.

THE official report of our foreign commerce for the month of May shows an unexpectedly large outward movement of manufactured goods, and minor articles of merchandise. The excess of exports over imports was $8,616,859.

OF the 1,000,000,000 acres of cultivable land in the United States, only 11½ per cent. are used. The 2,586,568,320 bushels of corn, wheat, oats, barley, rye, buckwheat, and potatoes raised last year were produced on 105,083,605 acres.

A CORRESPONDENT of the Scientific American suggests the use of torpedoes charged with dynamite and other explosives, and of the artesian augur when necessary, to set ships in extreme northern latitudes free from icefloes and icebergs.

A WRITER in the *British Medical Journal* asserts that in the last thirty years there has been a gradual dimiuution in the size of people's heads. The change was first observed by the hat manufacturers who have reduced the average hat two sizes during that time. Cause not stated.

THE census of cotton seed oil mills shows that there are 56, mostly in the south-west, using 410,000 tons of seed yearly. The oil, expressed by dydraulic pressure, is either barreled in the crude state or pumped to a refining room, where it is treated with caustic soda, obtaining 82 per cent of fine oil.

A SCHEME to save a day's ocean travel between New York and Liverpool, it is said, is under Mr. Vanderbilt's consideration. It involves the construction of a bridge from Manhattan Island to Hunter's Point, and the construction of a road to the extreme eastern end of Long Island, where a large shipping port will be established.

IN advance of the meeting of the Boston Committee of the World's Fair, letters have been received from prominent representatives of nearly every important trade interest, which indicate that public opinion is disposed to favor the exhibition. The negative attitude of the railroad companies went far to kill the project in New York, and, so far as known, that great interest has not yet committed itself to a cordial support of the attempt to revive the corpse in Boston.

THE total fish catch of Lake Superior amounts to about 1,500 tons a year.

READERS of Mr. Schuyler's "Peter the Great," in *Scribner's Monthly*, will remember the order of that famous reformer requiring Russian seamen to be clean-shaven. The present Czar has rescinded this rule and for the first time in 200 years beards will be worn by the sailors in the Russian navy.

THE United States Post Office might well follow the example of the post office of the United Kingdom in establishing a Post Office Savings Bank. Further facilities have lately been furnished, as an encouragement to small savings in the issue gratuitously of forms, which are about the size of an ordinary check, having twelve divisions, in each of which a penny postage stamp can be placed. When a form has thus been filled with twelve stamps it will be received at any post office at which there is a savings bank, as a deposit of a shilling. During the seven weeks that the experiment has been in operation in ten counties only, more than 14,000 of these forms have been received, and more than 7,000 new accounts opened through their agency. The arrangement promises to encourage thrift.

SCIENCE AND INVENTION.

NEW VARNISH.—Fr. Theie, of Bissendorf, prepares a varnish, consisting of 100 parts of rosin, 20 parts of crystalized carbonate of soda, and 50 parts of water, by heating these substances together and mixing them with a solution of 24 parts of strong liquor ammonia in 250 parts of water. With the mass thus obtained the pigments are levigated without the addition of linseed oil or turpentine; the paint dries readily without the aid of a drier and looks very well, especially when varnished. The paint keeps well even under water, and becomes very hard. The cost is said to be about one-third that of ordinary oil paints.

THE NOISE OF FIRE-DAMP.—The current of fire-damp as it flows into a working of a coal mine is attended with a grating sound which may be perceptible sometimes to acute ears, but which is unmistakable when this sound is magnified, so to say, by a properly adjusted microphonic apparatus to a qualified and conscientious observer above ground. Taking this grating noise into consideration with the readings of the barometer, there ought to be sufficient warning to bring up the miners at once, and so avert a wholesale destruction of human life, if not an otherwise disastrous explosion.

A NEW SELF-BLOWING FORGE.—An ingenious application of waste heat is shown by a self blowing forge invented by one of the firm of Heathfield, Eyre & Co., London, England. The hearth and the hood of the forge are of the usual pattern, but underneath the hood is suspended a small steamer. At the top is a safety valve and steam guage, while at the back of the hearth is a water guage. A return pipe is brought from the boiler to the tuyre, the water in which becomes pretty well heated before again entering the boiler. At the back of the forge is a small vertical engine with a 2-inch cylinder and 4½ inch stroke, which by means of a groved fly wheel and endless band, rotates the fan. When lighting the fire the bellows is worked for half an hour by hand, by means of a handle, and during this time sufficient steam will have been generated to drive the engine, which will then work automatically as long as required. The blast is regulated by means of a tap between the engine and boiler. The same engine can also be employed to run a small lathe, and will really do about one horse-power.

REFINING COPPER ORES.—At Lyons attempts have been made to adapt the Bessemer process to the refining of copper ores, by burning off the sulphur combined with the pyrites, but towards the end of the process the charge has cooled off too much. This obstacle has been overcome at Lyons by inserting a phosphor bronze which increases in temperature far beyond the copper and at length arrives at a dazzling white heat. The phosphorus in burning disengages an enormous amount of heat, which liquifies the copper. The Bessemer operation in copper refining is simply to add a small quantity of phosphorus to the charge, and thus obtain, after the combustion is all over, a cake of pure copper. A company has been formed in Lyons for the purpose of working the new process, and works have been laid down.

REVIEWS.

Underbrush. By JAMES T. FIELDS. Boston: Houghton, Mifflin & Co.

This volume consists of thoughtful and suggestive comments on a number of topics which include sketches of character and abound with pleasantries, of which "Our Village Dogmatist" and "Bothersome People" are fine instances. "Familiar Letter to Housebreakers" is a specimen of witty sarcasm and is most enjoyable. The author deals most felicitously in a light and masterly style with every subject he takes up, a few strokes sufficing to bring each scene before the reader. Let us commend the reader to the account of Abijah Doles, with his "preposterous manners" and abstracted ideas, and of whom it is recorded that he never picked up anything, for he was not cognizant of matter. "Diamonds and Pearls" embodies some interesting stories, in which these figure. "A Conversational Pitcher" is a capital instance of the author's power of suggestive writing. The book is an admirable one for summer reading. A vein of philosophy runs through its pages which sparkle with happy conceits and brilliant epigrammatic expressions.

Mr. Perkins' Daughter. By the Marchioness CLARA LANZA. NEW YORK: G. P. Putnam's Sons.

There are points in this novel that are true to the life. Mr. Perkins' daughter, "highly educated" and intensely selfish, despises her untutored father on account of what she esteems his vulgarity. Perkins, *pere*, takes his daughter to the continent there to circulate with the possibility of her entrapping a desirable lover, and his plain, brusque way of talking and acting alarms and disgusts her. Perkins' mind is always running on business, in fact on lumber, in which he has made a fortune, and he commits himself most comically in the politest of society. The inevitable match-maker turns up in France, and the doings with the view of entrapping wealth and fortune, the game being, in the apprehensions of the daughter, constantly on the eve of being spoilt by Mr. Perkins, are very amusing.

The Sword of Damocles. By ANNA CATHARINE GREEN. NEW YORK: G. P. Putnam's Sons. CLEVELAND: Cobb, Andrews & Co.

This is a strange but absorbing novel. As indicated by the title, dangers are encountered which threaten to destroy the efforts of ambition and the hopes of love. There is a crises in the fate of the hero which is happily passed.

Mademoiselle Bismarck. By HENRI ROCHEFORT. NEW YORK: G. P. Putnam's Sons. Cleveland: Cobb, Andrews & Co.

This novel is in Rochefort's best style, and those who seek excitement will not fail to find it. The heroine is a "seductive creature," the recipient of gallantries, one suitor supplanting another. The characters are numerous but well individualized. Pretentious dreams are being constantly snapped, schemers become entangled in their own craftiness, and generally there are rich denouements. Flirtations, intrigues, and broken vows abound. The wooing for money without the heart is the main idea of the plot. In this truly French work M'lle. Albert incites her lover to jealousy "because she loves him," and having sacrificed her honor kills herself.

Improvements in Cotton Machinery. HOPEDALE, Mass.: George Draper & Sons.

The main improvements effected in all departments of cotton manufacture, such as roving, spinning, twisting, spooling, reeling, warping, dressing, and weaving, are here recorded and beautifully illustrated.

Art Amateur for July. Edited by MONTAGUE MARKS. NEW YORK: 23 Union Square.

The issue for July is superb in its illustrations, the first being a mother bathing a child. Wit in artist's portrayals is exhibited in a number of sketches from Parisian illustrated journals. The "American Art Gallery" offers new attractions. Among the drawings are "XVI Century Tapestries" and drawings of decorative furniture. The text contains ample descriptive notes. Readers of the *Art Ameteur* learn what is going on in the practical world of art. The extra supplement has embroidery designs, and sketches for plaques; also a view of a Highland Piper.

St. Nicholas for July. Edited by MARY MAPES DODGE. NEW YORK: The Century Company.

Most appropriately this number of St. Nicholas has for a frontispiece "The Star Spangled Banner" followed by an engaging poem on this emblem of our power and independence. Among the attractive sketches, stories and articles for youth are—A Day Underground, Captain Sarah Bates, Stories of Art and Artists, How to Stock and Keep a Fresh Water Aquarium, Le Marchand de Coco, a French Sketch, In Nature's Wonderland, the Major's Big Stories and Jack in the Pulpit. St. Nicholas is redolent of fun and instruction.

Golden Days for Boys and Girls. PHILADELPHIA: James Elverson, S. W. Cor. Eighth and Locust Streets.

In this number the thrilling story of the "Steele Treasure," or the House that Jack Built is continued. "Cunning Workmen—insects, birds, &c.,—by a lover of nature, is most instructive and entertaining. "An Encounter with a Carabou," a true incident, is given by Mrs. Alex Stephenson. "The Floating Camp" is a story of vacation days, and there is another "How we Spent a Fourth of July at the Johnsons" that all youth will like to read. This weekly abounds with illustrations, charades, fun, &c.

Vick's Illustrated Monthly for July. ROCHESTER: N. Y. James Vick.

Mr. Vick is an eminent florist and the July number of his monthly, dealing with flowers, plants and vegetables, is as instructive as it is charming. No one with gardens should be without it. The illustrations are original and good. The page colored vignette presents a group of salvia's.

MINES AND MINING.

THE shipments of copper from the Copper Queen mine, Arizona, for nineteen days in June was 238,972 pounds.

VERY rich chlorides have been struck in large quantities in the Waterloo shaft of the Morning Star, Colorado.

THE ore settlements from the Matchless mine, Colorado, last month amounted to over fifty-two thousand dollars.

THE Custer mill, Idaho, is running regularly day and night, and turning out the usual amount of bullion—about $4,500 per day.

DRAIN boxes are now receiving from the Sutro mines, Nevada, over 4,500,000 gallons of water per twenty-four hours, and have a capacity for double that amount.

THE Mining Commissioner of Michigan reports the following as the iron and copper product for 1880: Copper, 24,800 tons, $10,000,000; iron ore, 1,987,000 tons, $19,000,000. Total, $27,000,000.

THE Mexican Government is about to subsidize railroads to connect the Santa Clara or Barranca coal mines of Sonora, where are two large veins of anthracite coal that could be delivered on the coast at $4 per ton.

THE Magna Charta mine, Butte, Montana, will soon have a Howland pulverizer in position, which will crush twenty tons of ore daily. The main shaft is now down 287 feet. The ore shoot lately struck in the east drift has proved to be very rich.

MINING for beryls and other precious stones is being prosecuted with success some five miles from Taylorsville, North Carolina, on the Statesville road—a valuable vein lately reached. A shaft has been sunk and a tunnel to carry off the water is now completed.

A MACHINE for blasting coal by compressed air has been patented by Ellis Lever, a well-known coal operator in New Zealand, who has perfected it at a great cost of money and time. Arrangements have been made with the British Royal Commission on Accidents in Mines to witness experiments in blasting with this machine.

N. Y. Mining Record:—The weakening tendency in the New York Mining stock market continues. The selling interest has been increased by operators being unwilling to carry stocks through a summer vacation. The interest in Leadville stocks has chiefly centered upon Hibernia and Iron Silver. The Hibernia mine is out of ore, and the last dividend, it is said, was paid with borrowed money. The interest in Chrysolite appears to be reviving, the transactions of the past week amounting to 5,500 shares at prices considerably higher that lately; highest and lowest prices 5.25 and 6.25. Arizona mines are steadily improving. Bodie stocks rule dull. Shares in Horn Silver have changed hands at 16.50 down to 15; Alice has sold at 17.15 to 17.25.

THE South Pioneer, for which $50,000 has been paid is regarded as without a peer in Arizona, excepting the King, which is conceded to be the "boss" mine of North America. The now famous Mack Morris, when no more developed than the South Pioneer is at present, is dwarfed by a comparison. Two four men shifts can take $160,000 in one month and not go below the seventy foot level, or more than 100 feet from the north end of the claim.

AN Indian has revealed to Al. Olden, a well known prospector, three veins in a mountain near Oscuras, New Mexico. from eighteen inches to five feet in width, while the bottom of the gulch was filled with thousands of tons of ore. An assay was made of the ore which showed from fifteen to eighty per cent. of copper and from four and a half to thirty-two ounces of silver. That it leads the great Clifton mines there can be no doubt says the Socorro *Sun*.

THE actual output of lead ore from the mines of Leadville, Col., reaches about 700 tons a day. Of this a small amount produces from forty to sixty per cent. in lead, and from that down to ten per cent. As far as can be learned by consultation with the leading smelters, the actual average is less than twenty per cent., from sixteen to seventeen per cent. being about the correct figure. The large output of ore credited to Leadville, and the percentage of lead usually figured at from thirty to forty per cent., causes the impression among Eastern lead buyers that the supply is to be very great and undoubtedly causes a decline in prices. The best course for Leadville smelters to pursue is to give regularly and frequently, as was formerly done, the exact figures, and then no false impression will be created.

A CORRESPONDEFT of the New York *Mining Record* writes as to the National and Huron mines, Michigan: Assessments have been levied on the National and Huron to pay the expenses of reopening the galleries, and the prospects of both are excellent, unless the bottom drops out of the copper market. The National is an old mine and in past years has paid dividends, but during the long period of low prices for copper it was idle and filled with water. Good progress is now being made in pumping it out, and the work of taking out ore will no doubt begin in August or September If copper mining outside of the Calumet and Hecla has any future in this country the stock would seem to be dog cheap at the present price of about $2 a share or the amount of the last assessment. Huron is already producing copper.

LARGEST STEAM HAMMER IN SCOTLAND.—A steam hammer, just erected at the iron and steam works of I. & W. Beardmore, Parkhead, Scotland, is built on the Rigby type, which differs mainly from the Nasmyth hammer in the piston rod forming the hammer, instead of a small piston rod and a cast iron tup, and, though of colossal proportion, is wonderfully simple in make. The foundation on which it stands is a bed of iron concrete, 20 feet thick, and weighing 500 tons. The hammer delivers blows having a force of between 300 and 400 tons with a rapidity which allows the steel to be perfectly worked before growing cool, producing a better slab, and reducing to a minimum the risk of breakages through unfair resistance. This little pocket-piece was christened "Sampson."

VELOCITY OF LIGHT.—Professor G. Forbes lately explained to the London Physical Society the experiments made by him and Dr. Young to determine the velocity of light. The speeds of the toothed wheel were adjusted until the two rays appeared of equal brightness. The general result was that the velocity of the light of an electric lamp is 187,200 miles per second. Corner ner found the light of a petroleum lamp to be 186,500 miles per second. The higher number of Professor Forbes is probably due to the bluer light of electricity, for further experiments made with colored lights and the spectrum seemed to prove that blue light travels probably over one per cent. faster than red light. The experiments were made at Wemyss Bay, in Scotland.

MACHINERY FOR WASHING AND SCOURING WOOL.—This is an invention or combination of mechanism for dragging the wool from the washing contrivance up the incline to the squeezing rollers. One of the modifications consists of two sets of frames rammed with teeth, the rays of the teeth in one frame alternating with the rays of the teeth in the other frame, while another modification makes use of only one frame to drag up the wool, the other frame having a lifting movement to retain the wool. The frames are similar to a harrow in construction.

RAILROAD car-wheels are now kept in their place without being keyed on. In former times they were almost sure to precipitate an accident; besides, keys would drop out by the constant jar and be weakened by the axle and wheel. Axles are turned to fit the wheel snugly and are driven in place by hydraulic pressure. Previous to being driven, the axles are covered with a thin coat of white lead and oil, which hardens in a short time and holds the wheel so firmly in place that a pressure of from 100 to 140 tons is required to remove a broken axle from the wheel in which it is placed.

MARKETS.

FINANCIAL.

Office of the TRADE REVIEW.

[FRIDAY EVENING, July 8.

The demand for money in the local market is not pressing and bank accommodation is given at 7 to 8 per cent. on time and 5 per cent on call. The supply of loanable funds is large and the market easy at quoted rates. Eastern exchange is quiet and steady. The mercantile demand is light. Current buying and selling rates are as follows:

	Buying.	Selling.
New York Exchange	1-20 dis.	Par.
Boston Exchange	1-20 dis.	Par.
Philadelphia Exchange	1-20 dis.	Par.
Baltimore Exchange	1-20 dis.	Par.

There is but a moderate demand for foreign exchange, and the market is easier, without any quotable change in rates. Offerings of Government four per cents to our bankers are quite liberal, and were bought at 117⅛@117⅜, the former being the closing price.

IRON.

Business is more active and the features of the market indicate shortly an advance. The great turning is looked for toward the close of the present month. The output of furnaces turning out the better descriptions is being steadily absorbed. The higher rates of freight somewhat lessen the competition of foreign iron. British as well as American furnacemen are commencing to curtail production, and the output, both at home and abroad, will be materially diminished within the next few weeks. For Scotch pig we quote round lots Coltness, $23.50; Glengarnock, to arrive, $22; Gartsherrie yard, $23; dock, 523; Summerlee, $23.50; Carnbro, $21.50; Eglington dock, $20.50. In English pig Middlesboro is quoted at $18@18.50 for No. 3, and $17@17.50 for No. 4; Bessemer pig, $22 but nominal. Scrap iron continues weak. Quotations for American steel rails range from $54 to $55 for winter delivery, up to $60@$62 for summer, but prices are quite irregular. Plate iron is more firmly held and a stronger feeling is reported at the mills.

CINCINNATI.-(Reported by Rogers, Brown &Co.) There is a noticeable improvement in the pig iron market, so far as relates to demand. Sales are more numerous and prices are firm at the decline. The clearing off of stocks in consumers' hands, reduction of the number of furnaces in blast, and the slight improvement in the English market give a more hopeful outlook for the furnaces. A steady market is assured, and many look for stiffer prices as the result of the active July buying. We make no change in quotations: Hot Blast Foundry Iron—Hanging Rock charcoal No. 1 $26.50@27.00, 4 months; No. 2, 25@26, 4 mo.; Southern No. 1, $25@25.50, 4 mo.; No. 2, $24 00@$25.00, 4 mo.; Strong Coke, No. 1, $23@24,00, 4 mo.; No. 2, 22.00@23.00, 4 mo.; No. 3, $21.00@22,00, 4 mo.; Hocking Valley, No. 1, $22@23.50, 4 mo.; No. 2, $21.00@$22, 4 mo.; American Scotch, No. 1, $21.00@23, 4 mo.; Forge--Strong Neutral, No. 1 Mill, $21, 4 mo.; Cold Short, No. 1, $20.00, 4 mo. Car Wheel and Malleable--Hanging Rock Cold Blast, $37@41, 4 mo.; Hanging Rock Warm Blast, $29@32, 4 mo.; Southern Car Wheel $33@38, 4 mo.: Lake Superior, $33@35, 4 mo.; Lake Superior Malleable, $33@$35.

CINCINNATI.--(Reported by E. L. Harper & Co.)--There is nothing of importance to communicate concerning the market since our last report. The orders booked are principally for quick delivery.

PITTSBURGH.--(Reported by E. D. Wassell.) No 1 Wrought Assorted and Cut, $31.00 per 2,000; Boiler Scrap cut up, $35.00 per 2,000; Heavy Plate cut up, $32.50 per 2,000; Machinery Metal, $18.00 per 2240; Stove Plate, $15.00 per 2240; Locomotive Tank, cut up, $29.00 per 2000. Business is dull as is usually the case at this time of year.

LEAD.

Owing to the cheapening of railway rates, there have been extensive shipments made to England. Stocks are somewhat low. Prices are firm at 4.2 cents for hard and 4.3 to 4.35 for soft.

COAL.

The receipts of coal at this port have been considerable. Vessels continue in only moderate supply. The domestic trade is dull, but manufactories are consuming on an increased scale. For the balance of the year a heavier production is to be anticipated. Much more than is being delivered could be absorbed without a break in prices.

TIN.

The decline in the London market has affected Common Pig. The market is without animation. Prices in London have declined to $425. In a jobbing way, holders have asked 20¾ to 20¾ cents, but round lots have been obtainable at 20c.

SPELTER AND ZINC.

In spelter, moderate sales of Western are reported at 4⅞ to 5¼ cents according to brand, the inside price for ordinary quality, and the latter figure for best Missouri, but the demand is not very brisk and trade moves along slowly. Silesian has sold at 5¼ to 5¼ cents according to brand. Domestic and Foreign Sheet zinc is unchanged in price, store parcels selling at 6¾ to 6⅞, but the demand has not been brisk.

OILS.

The petroleum market is firm at previous prices, and exports are somewhat active. Lard oil is in steady request. The demand for cotton seed oil has been moderate. Whale oil shows some advance. Fish oil is without change.

COPPER.

Copper is weak, with but moderate demand. We quote: Lake ingot, ℔ lb., 18¼c.; Baltimore ingot, 18¼c.; Sheathing, 26c.; Y. M. Sheathing, 17c.; Braziers', 28c.; Bolt, 28c.; Y. M. Bolt, 20c.

HARDWARE.

Jobbers are doing a good business for this period of the year. Stocks are generally in good shape, and confidence is entertained that requirements of consumers will exceed those of any previous year. For sharp edge tools there is a particularly good demand; and for all leading descriptions of shelf hardware. There is some irregularity in the price of nails, mainly due to the reductions allowed by parties who bought before the recent rise.

LUMBER.

Arrivals continue large. Lumber moves steadily and at no abatement of figures. There is a good sale for shingles and both shingles and clapboards are firmly held. Hemlock is particularly firm. The filling of accumulated orders gives an appearance of great activity to the Cleveland lumber yards. The facilities which Cleveland possesses for delivery appear yearly to attract more trade. Assortments are being steadily completed. A limitation in the quantity of dry lumber restricts the orders of country dealers. Better prices for all descriptions are looked for after harvest. Hardwood commands readily the quoted figures; oak and walnut according to quality command exceptionably high rates.

WOOL.

The wool market is characterized by activity and firmness. Improved prices abroad, and the circumstance that there is little available wool for exportation, tend to strengthen the prices of the new wool now coming forward. Buyers in Ohio appear indisposed to give the prices asked, but there is no doubt that those prices are fully justified by the position of the market. For combing and delaine there is an especially good demand. We quote Ohio XX 43@45c.; Do X, 42@44c.; do No. 1, 45@47c. Washed combing and delaine Ohio 44@47.

LUMBER.

PLANK.

2 INCH--MIXED WIDTHS.

A 1&2, $45, A3, $35, B. $28, C. $18, D. $14, E. $12.

1¼ AND 1½ INCH.

A 1&2, $44, A3, $35, B. $28, C. 18. D $14. E $12.

BOARDS.

1 INCH MIXED WIDTHS.

A 1&2, $42, A3, $32, B. $24, C. $16. D. $14, E. $12.

STOCK BOARDS.

12 INCHES WIDE.

A 1&2, $43, A3, $34, B. $26, C. $17, D. $15, E. $13.

STRIPS.

6 INCHES.

A 1&2, $40, A3 $33, B. $28, C. $18, D. $14, E. $12.

WORKED LUMBER

Flooring.
A3, $35, B. $30, C. $20.

Norway Flooring.
A3, $28; B $22; C $18.

Matched Drop Siding, 6 in.
A3, $36, B, $30, C, $20

Beaded Ceiling $2 higher than flooring

One half inch Bevel Siding.
A 1&2, $22, A3 $20, B $18

Ash Flooring, A1&2 $35.

BILL STUFF.

Small, 18 feet and under, $14.
20 feet and over, $5 less than length.

SHINGLES, LATH AND MILL WORK

Shingles XXX 18 inches	$3.75
Shingles Clear Butts	2.75
Lath	2 50
Surfacing one side $1.50; 2 sides	$2.00
Making, Flooring and Drop Sidings	2.50

HARDWOODS.

OAK.—1st and 2d clear, 1 to 4 inch	$35 00
3d	30 00
1st common	25 00
2d common	28 00
BLACK WALNUT—Clear counter tops, 20-inch and up	150 00
1st and 2d inch	75 00
1st and 2d plank	80 00
Common	55 00
Select, ⅝x10 inch and over	68 00
ASH--1 to 2 inch, $35, over 2 inch	38 00
Wagon stock	40 00
HICKORY wagon stock 1 to 4 inch	50 00
MAPLE--Clear, 1 to 4 inch	35 00
BUTTERNUT--1st and 2d clear, 1-inch	55 00
CHERRY--1st and 2d clear, 1-inch	60 00
WHITEWOOD--Clear selected, w'd 1 to 4 in.	40) 0
1st and 2d clear, 1 to 4 inch	35 00
Selected	30 00

Blacksmiths, Hardware MEN. and AGENTS, should read this.

Little Giant
Wagon Tire Upsetter.

This machine is strong, durable and cheap, and is superior to all others for upsetting or shrinking wagon tires, and bars of iron without cutting them. It will upset tires one inch at a heat, and is adapted to tires of any size or diameter. Every blacksmith should have one. They are the best selling machines hardware merchants and agents ever handled. Price only $12.00.
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This Burner is used on the
Front Rank
GASOLINE COOK STOVE.
It is straight, with but one valve and has been tested for four years, giving entire satisfaction. The gas jet is thrown direct to the top of the combustion cap, producing a steady blue flame, absolutely odorless, which cannot be done with any side valve burner. There is no packing used in this Stove. Agents wanted. Send for Circular and Price List. Address
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Adzes.

Carpenter's.....per doz $16 80
Ship..... " " 18 75
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Berea, per doz..... 4 00
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American Stamped Elbows

Genuine Russia Iron

4 inch per doz..... 4 50
4½ do do 5 50
5 do do 7 50
5½ do do 8 50
6 do do 9 50
7 do do 11 00

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4 inch, per doz..... 4 00
4½ do do 5 00
5 do do 6 50
5½ do do 7 50
6 do do 8 50
7 do do 9 50

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4 inch, per doz..... 2 00
¼ do do 2 50
5 do do 3 50
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6 do do 4 50
7 do do 5 50

25 per cent

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C S cut augurs.....40@10
do do do bits.....40@10
D C gimlet do....$6.00 Gross
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Russell Jennings'.....10 10@10
Cook's pat augur.....40@10@50
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Bellows. Dis

Blacksmith's com new list, 40 ℔ ct
Moulder's new list, dis 40 ℔ cent
Hand, new list, 40 per cent

Bolts. Dis

Carriage and tire, com 80@80 @5
do do Norway.. 70@
Stove.....@40
Plow.....@40
Wagon.....@40
Machine & Square head 60@10

Butts. Dis

Wrought brass..... 75@5
Cast, loose joint and loose pin..... 55&10
Wrought, fast joint narrow..... 50&10
Wrought fast joint broad..... 55&10
Wrough loose joint broad..... 55@10
Wrought table and back flaps..... 50@10
Loose pin, reversible... 55@10
Brass kettles—per lb.. 32@35

Chains.

Coil by cask.....

3-16	¼	5-16	⅜	7-16	½
9¼	7¼	7	6¼	6	6

Crucibles.

Per number..... 4@ 4½

Clothes Wringers

Keystone per doz..... 42@45
Novelty per doz..... 45@60

Chisels.

Hot and cold cutting..℔ lb..$ 30
Railroad track..... 30
Machinists..... 30
Chipping, mallet head 50
Cape..... 50
Packing..... 50
Stone cutters..... 50

Crowbars.

Steel point.....℔ lb $ 5
Solid steel..... 8

Drawing Knives.

Discount.
Witherby's.....60@10 ℔ cent
Barton's..... 15
Adjustable handle.... 10

Emery.

Genuine Chester..... 7@ 8
Wellington..... 10@12

Files.

Rothery 30 per cent
Disston.. ..... 40@45

Hammers.

Mason's stone hammers, steel faced and pene.....℔ lb 15
Mason's stone hammers, solid cast steel..... 25
B. S. Napping hammers 30
Striking hammers, solid cast steel, 5 to 25 lb..... 20
Drilling hammers, solid cast steel, 3 to 6 lb..... 20
Turning hammers, full polished.....each 2 00
Set hammers.....℔ lb 35
Creasing hammers..... 35
Ordinary bush hammers 55

Hinges.

Champion double acting spring hinges.....dis. 30
Hook and Eye hinges ¾ to 1 in. 6¼c; ½ in. 7½c; net ¼ in. 10c
Strap and T, new list dis 50,10
Screw Hook and Strap 8, 10 @10 and 12 in. net 4¼c
Clark's Gate hinges No. 1 & 2, dis 50c. and 10
Shepard's Gate hinges, Nos, 10, 20 and 25, dis 30

Horse Rasps.

Heller's.....dis per cent 20
"Arcade"... 50 & 20

Harrow Teeth.

Iron ½ to 1 inch.....per lb 2¾c
Steel, square..... 4½c

Nails.

BRADS AND FENCE.

10 to 60d..... $2 90
8 and 9d advance..... 25
6 and 7d..... .....do..... 50
4 and 5d..... 75
3d..... 1 50
2d..... 2 75
3d fine..... 3 00
2d fine..... 3 75
¾ inch lining..... 4 50
4d barrel..... 1 00
1¼ inch barrel nails..... 1 50
1½ do do do..... 1 75
1 do do do..... 2 50
¾ do do do..... 3 00
Cut spikes, all sizes..... 25
Clinch nails, all sizes..... 1 75
Casing and box nails 75 cts advance
Finishing nails, $1 25 do
Tobacco nails, 50 cts do

Nuts and Washers

Dis
Nuts..... 7¾
Washers..... 7

Rivets. (See list) Dis

Iron, in paper..... 50
Iron, in bulk..... 30
Copper.....33⅓ per cent

Picks.

Railroad, 4 to 5 lbs...doz $7 75
5 to 6 lbs... 7 75
6 to 7 lbs... 8 50
7 to 8 lbs... 9 50
Railroad Tamping Pick.....
7 to 8 lbs..doz 13 50
Mill Picks per lb..... 75c

Squares. Dis

Steel or iron, case lots..... 50
Try squares and T bevels..... 45

Spikes—WROUGHT

All lengths by ¼ inch.....4¾c
do do do 5-16..... 3½
do do do ⅜, 7-16 & ½ in 3¼

Shovels and Spades.

Ames' new list, Jan. 26, 1881,..... dis 15
Hussey, Binns & Co. patent.....dis 15
Old Colony.....dis 12½
Remington's (Lowman's Patent).....dis 25
Rowland's.....dis 40
Griffiths... ... . dis 40&10

Shovels and Tongs.

Iron and Brass Head, R. & E. list.....dis 50&10&2
Polished Steel, new list ..dis 50&10&2

Sad Irons.

From 4 to 10 lbs....per lb 3½ net
Self-Heating.....℔ doz $9 net
" Tailors..℔ doz $18 net
Gleason's Shield and Toilet.....dis 25
Mrs. Pott's Irons, double pointed.....dis 35
Mrs. Pott's Irons, square back.....dis 40
Enterprise Star Irons.....dis 40
Combined Fluter and Sad Iron.....℔ doz $15, dis 15

Saw Sets.

Boynton's patent X Cut, per doz $12; Hand Saw, per doz $10.....dis 20
Stillman's Genuine, per doz $3 50 and $5 50.....dis 10
Stillman's Imitation, per doz $3 25.....dis 20&10
Common Lever, per doz $2 dis 30&10
Leach's No. 0 $8; No. 1 $15; dis 15
Hammer, Hotchkiss $5 50, dis 10
" Bemis & Call Co.'s new patent.....dis 40&5
Bemis & Call Co.'s Lever and Spring Hammer..dis 30&5
Bemis & Call Co.'s Plate..dis 10
" " Cross-cut dis 12½
Aiken's Genuine...$13, dis 50&10
" Imitation.....$7, dis 50
Hart's Patent Lever.....dis 20
Disston's.....dis 20

Scales. Dis

Fairbanks'..... 25

Screws. Dis

Flat head iron or steel per cent dis..... 40
Flat head brass..... 40
Round head iron or steel..... 35
Round head brass..... 30
Coach or lag.....60@10 ℔ ct

Wire.

Brass and Copper.....dis 20
Bright & annealed, Nos. 0 @ 18 dis 55
" " Nos. 19 @ 20 dis 60
" " Nos. 27 @ 36 dis 65
Coppered.....Nos. 0 @ 18, dis 50
Galvanized, Nos. 0@6, ℔ lb 10c.....dis 40
Galvanized, Nos. 7 @ 18, market list,.....dis 45
Tinned, Nos. 0 @ 18,.....dis 45
Cast steel.....dis 30
Tinned Broom Wire, Nos. 18 @ 25.....dis 50
Annealed Fence, Nos. 8 and 9.....dis 55
Annealed Grape, Nos. 10 to 14.....dis 55
Galvanized Telegraph, Nos. 7 to 9.....℔ lb 9c
Galvanized Telegraph, Nos. 10 and 11.....℔ lb 10c
Galvanized Telegraph, No. 12.....℔ lb 10½c
Fence staples.....℔ lb 7½@7½c
Fence Staples, galvanized, ℔ lb 8¼@8½c
Stubs Steel Wire.....$7 00 to £

Tank Iron.

8-16, ¼ and ⅝ inch thick.... 3 20

Tacks. Dis

Black..... 30—10
Tin'd..... 55—10

Traps. Dis

New House..... 30
Peck, Stow & Co..... 50—10

Vises.

olid box, Dis.....40

Wrenches.

Coe's genuine.....50
Coe's Imitation 60 per cent

Bag Holders.

Sprengle's Pat, $18.00 per doz 40 per cent. dis.

Gas and Steam Fitters' and Machinists' Supplies.

Gas and Steam Pipe—See Pipe Wrought.
Enameled Pipe.....dis 65
Artesian Well Casing....net list
Hydraulic Tubes.....net list
Malleable Iron Fittings..net list
Cast Iron Fittings.....dis. 55
Globe Valves.....dis. 50
Angle Valves.....dis. 45
Check Valves.....dis. 45
Safety Valves.....dis. 45
Eddy Gate Valves.....dis. 20
Steam Cocks.....dis. 45
Service Cocks.....dis. 45
Ball Gauge Cocks (net per dozen).....$15
Compression Gauge Cocks dis. 45
Miss. Gauge Cocks.....dis. 45
Register Gauge Cocks (net per dozen).....$15
Cylinder Cocks.....dis. 45
Air Cocks (net per dozen)..$2 75
Oil Cups.....dis. 45
Steam Gauges.....dis. 35
Water Gauges.....dis. 45
Scotch Glass Tubes.....dis. 60
Steam Whistles.....dis. 45
Iron Body Globe Valves..dis. 55
Iron Body Safety Valves..dis. 55
Iron Body Steam Cocks..dis. 55
Pipe Tools.....special
Globe, Angle and Check Valves (Powell's regrinding).....dis. 45
Guarantee "Jet Pumps" dis 40
Mack's Injectors.....dis. 25

Boiler Plates.

("Gaylord"--Standard Quality.)
C. No. 1.....4 50
C. H. No. 1 Shell.....4 60
C. H. No. 1, 50,000.....5 00
C. H. No. 1, 55,000.....5 50
C. H. No. 1 Flange.....6 00
Firebox.....
T. S., 60,000.....(as per)..6 09
T. S., 65,000.....(act of)..
Homo. Steel, 70,000 (of Cong).8 00
Heads, ¼c ℔ lb. extra.
N.B.—Eastern brands of boiler plate at from 2-10 to 3-10c ℔ lb less than above prices.

Boiler Rivets—"Albany."

⅛, ¼, 11-16, and ¾ in. diam.5 50

Sheet and Tank Rivets. "Norway."

All sizes.....dis. 15

Nuts, Bolts, etc.

Square and Hex. Nuts....dis 7
Washers.....dis 7
Machine Bolts.....dis 60
Bolt ends.....dis 60
Boiler Patch Bolts.....net list

Boiler Tubes.

"National" Standard Gauge 1 inch to 10 inch.....dis 40
"National" Standard Gauge 11 inch to 15 inch.....dis 25
"National" Special Locomotive Tubes.....net list

Boiler Makers' Tools.

Doty's Power Shears....net list
" Hand Lever Shears.net list
" Power Punch.....net list
" Hand Punch.....net list
Steel Screw Punch.....net list
Iron Screw Punch.....net list
Boiler Plate Rolls.....net list
Buffalo Forges & Blowers dis 20
Watson's " " net list
Spring Tube Expander....dis 15
Roller Tube Expander..net list
National Tube Cleaner...dis 20
Wire Flue Brushes.....net list
Anvils—"PeterWright" 12½ ℔ lb
Solid Box Vises.....net list
"St. Louis" P Vows.....dis 20

Tinners' Tools & Machines.

Machines (P. S. & W.) list add 20
Tools (P. S. & W.).....add 6

IRON AND STEEL.

Flat Bar.

1¼ to 4 by ¾ to 1 inch..... 2 25
4¼ to 6 by ¾ to 1 inch..... 2 35
1¾ to 6 by 1¾ to 1¼ inch.... 2 65
1¾ &1¼ by ⅜ to ¾..... 2 35
1 & 1¼ by ⅜ to ¾..... 2 45
⅝ ¾ and ⅞ by ⅜ to ½..... 2 65

Rounds and Squares.

1 to 1¾..... 2 25
2 to 2¾..... 2 45
2¾ to 3¼..... 2 75
3¾ to 4..... 3 25
¾ to ⅞..... 2 35
⅝ to 9-16..... 2 45
½ to 7-16..... 2 65
⅜..... 2 85
5-16..... 3 05
¼..... 3 25
3-16..... 5 25

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch. 2 45
1 to 1¾ by ¼ and 5-16 do 55
¾ to ⅞ by ¼ and 5-16 do 2 75
⅝ to ¾ by ¼ and 5-16 do 3 25

Half Oval and Half Round.

Wagon box iron ¾ and ⅞... 3 75
1-10c per lb extra will be charged for cutting to specified lengths

Light Band.

1¾ to 2¾ by ¼ to 3-16..... 2 75

Hoops.

1¾ to 2 , Nos 16 to 18..... 3 35
2¾ ts 3¼ do 13 to 15..... 3 25
1-10 extra for each gauge lighter

Sheet Iron.

No 22 to 24..... 4 00
No 25 to 26..... 4 20
No 27..... 4 40
No 28..... 4 80

American Steel.

Best tool steel.....14½c
Machinery steel.....9
Double shear steel.....21@2

Bessemer Steel Tire.

¾ to 1 by 3-32..... 4½ ℔ lb
¾ to 1 by ½ to 5-32..... 4½ ℔ lb
¾ to 1 by 3-16 to ⅜..... 4½ ℔ lb

SCRAP IRON AND OLD METAL

DEALER'S SELLING PRICES.

	Net Tons.
No. 1 wrought scrap	$27@24
Sheet and hoop "	12@13
Cast scrap, (No. 1 heavy).	19@21
Cast Scrap (Stove Plate).	12@13

OLD METALS.

Old copper per lb	17c
No. 1 H. Brass per lb	16
Heavy yellow Brass do	13
Light Brass per lb	10
Scrap Zinc per lb	@3¾c
Tea Lead per lb	@3½
Heavy Lead per lb	4 @4½

PIPE, WROUGHT.

Gas and Water.

Size, Inside Diam	Price Per Foot Black	Price Per Foot Galvan	Price Per Foot Enamel	Weight Per Foot
⅛..	08			24
¼..	08	11	11	42
⅜..	09	12	12	56
½..	11	15	15	85
¾..	13½	19	19	1 12
1 ..	19	28	28	1 67
1¼..	27	40	40	2 25
1½..	33	47	47	2 69
2 ..	46	64	64	3 66
2½..	75	1 00	1 90	5 77
3 ..	95	1 30	1 30	7 54
3½..	1 25	1 70	1 70	9 05
4 ..	1 50	2 05	2 05	10 72
4½..	1 75	2 40	2 40	12 49
5 ..	2 25	3 00	3 00	14 56
6 ..	2 75	4 00	4 00	18 77
7 ..	3 75	...	...	23 45
8 ..	4 75	...	...	28 35
9 ..	6 50	...	...	34 07
10 ..	8 00	...	...	40 64
12 ..	12 00	...	...	...

Above 12 in. special rates; discount 65 per cent.. Markets are firm.

TINNER'S STOCK.

Tin.

10x14 IC	charcoal	6 75
do IX	do	8 75
12x12 IC	do	6 75
do IX	do	8 75
14x20 IC	do	6 75
do IX	do	8 75
do IXX	do	10 75
do IXXX	do	12 75
do IXXXX	do	14 75
DC, 100 plate, charcoal		12¾x17 6 75
DX	do	12½x17 do... 8 75
DXX	do	12½x17 do... 10 75
DXXX	do	12½x17 do... 12 75
DXXXX	do	12¾x17 do... 14 75
14x20, IC	roofing	do... 6 25
do IX	do	do... 8 25
20x28, IC	do	do... 13 00
do IX	do	do... 17 00
Pig tin.....		23
Pig tin banca.....		25
Bar tin.....		24

Copper.

Tinned.....	@26
Copper bottoms.....	@29
Alloy sheets.....	12¼
Braziers copper.....	@28
Planished copper sheathing size.....	@36
Boiler sizes do.....	@38

Zinc.

Sheet by the cask.....	@ 7¼
Sheet less than cask....	@ 8

Sheet Iron.

Galvanized, No 17 to 20	12
do do 22 to 24	13
do do 25 to 26	14
do do 27	15
do do 28	16
45 dis.	
Russia Iron by bundle	12⅞

Pat Planished Sheet Iron.

[A].....	11
[B].....	10

Nos	10	15	21	25
to	14	20	24 & 26	
Com	3-60	3-80	4-00	4-20
Char	5-60	5-60	6-00	6-20

Sheets over 28 in. wide ¼c extra

GLASS.

(Per box of 50 feet)

SINGLE STRENGTH

6x8 to 10x15.....	7 50
11x14 to 15x24.....	8 50
16x24 to 20x28.....	9 75
15x34 to 24x30.....	10 75
26x28 to 24x36.....	11 50
26x36 to 26x44.....	13 25
26x46 to 30x50.....	14 00

DOUBLE STRENGTH

6x8 to 10x15.....	11 75
11x14 to 15x24.....	13 25
16x24 to 20x28.....	15 75
15x34 to 24x30.....	17 25
26x28 to 24x36.....	18 50
26x36 to 26x44.....	21 25
30x50.....	22 50
30x52 to 30x54.....	23 25
30x56 to 34x56.....	25 00
34x58 to 34x60.....	27 75
36x60 to 40x60.....	30 00

Dis 60 & 10 single, 60 & 20 double

OILS & AXLE GREASE

Pure Oils. packages included

Sperm, winter bleached per gal.....	1 30@1 40
Elephant, winter bleached, per gal....	80@ 85
Whale, winter bleached per gal.....	60@ 65
Seal, winter bleached	80@ 85
Bank oil.....	48 @ 51
Straits.....	50 @ 53
"A" oil for tanner's use	35 @ 40
Lard oil extra winter.	85 @ 88
do No 1 do.....	65 @ 68
do No 2 do.....	52@ 55
Tallow oil.....	60 @ 65
Neat's foot oil pure....	80 @ 83
do No 1.....	65 @ 70
Linseed oil, raw	59 @ 62
Linseed oil boiled.....	62 @ 65
Cotton seed oil white..	63 @ 66
do do yellow	60 @ 63
Resin oil, first run....	25@ 30
Naphtha deodorized..	15@ 20
Carbon oil Ohio legal trst.....	9½@11½
West Virginia lubricating 28 deg.....	22@ 30
Pure Mecca.....	55@ 50
Paraffine oil winter pressed grav 25	
do do do	25@ 30
Paragon lubricator..	@1 00

Compound Oils, (light color'd)

No 1 Sperm signal oil..	65@ 68
No 2 do do....	58@ 63
No 1 wool and spindle oil.....	40@ 50
Golden machinery oil.	30@ 35
No 2 Mecca (dark colored).....	20@ 30
Axle Grease (light colored per gross ...7 50@ 8 00	
do in kegs and barrels per lb.....	04@ 05
Tallow, prime	5½@
Tallow, dark and No. 2	@ 4½
Beeswax.....	20@

PAINTS.

Drop black, Eng	℔ lb	18 @30
do do Am.	do	12 @15
Black lead	do	6 @12
Lamp black Eddy's refined per lb.....		27 @31
Lamp black, Germantown, per lb.....		10 @12
Lamp black ordinary per lb.....		6 @ 8
Chinese blue.....	℔ lb	75 @80
Prussian do	do	45 @60
Ultramarine blue	do	18 @40
Clestial blue	do	8 @10
Paris green	do	25 @30
Chrome green	do	8 @14
Fr Crown green	do	16 @18
Eng Vermillion	do	70 @80
Am Vermilion	do	15 @18
Indian red Eng	do	11 @14
Venetian red, Eng	do	1½@ 2¼
Orange mineral	do	10@14
Rose pink best Eng	do	13 @15
Red lead, Eng	do	8½@ 9½
Carmine No 40	℔ oz	30 @75
Umber	℔ lb	5 @10
Sienna	do	5 @15
Vandyke brown	do	8 @10
Spanish brown	do	1¾@ 2¼
Chrome yellow	do	16 @33
French Ochre	do	2 @ 3
Am Ochre	do	1¾@ 2
Iron clad paint	do	1½@ 2½

Colors in Oil.

Drop black.....	℔ lb	12 @24
Black paint.....	do	8 @12
Prussian blue.....	do	20 @45
Blue paint.....	do	8 @12
Raw umber.....	do	8 @15
Burnt umber.....	do	8 @15
Raw sienna.....	do	8 @16
Burnt sienna.....	do	8 @16
Vandyke brown..	do	8 @16
Paris green.....	do	15 @35
Chrome green....	do	8 @13
Indian red.....	do	10 @18
Venetian red....	do	7 @12
Chrome yellow...	do	12 @24
Yellow Ochre.....	do	7 @12
French crown green	do	16 @18
Marseilles green..	do	18 @
Iron clad paint...do		4½@ 5

Turpentine Varnishes.

Wearing body finishing	@6 00
Hard drying body.....	@5 00
Rubbing body.....	@4 00
Extra coach.....	2 60@3 00
No 1 coach.....	1 50@2 00
Coach makers, Japan..	2 00@
Japan, dryer, (turpentine	95@1 10
Nobles & Hoares' coach body (gold).....	6 25@
No1 furniture extra....	1 40@1 75
No 2 furniture.....	1 00@1 50
White Demar, (parlor finish).....	2 00@2 25
Spirit varnish (shellac) pure	4 00@4 25
Black Asphaltum self-drying.....	1 00@1 50

White Leads in Oil.

Sherwin Williams & Co's strictly pure	℔ lb	7@7½
Fair to good.....	do	5½@ 6½
J H Morley & Co's strictly pure....	do	7@7½

Miscellaneous.

White Zincs in Oil...	8½@ 11
Miller's surfacing liquid, ℔ gal.....	@2 00
S W & Co's china gloss.....	℔ lb 16 @ 18
French zinc.....	do 9½@ 10
Paris white.....	do 1¾@ 2¼
Whiting.....	do 1 @ 1¾
Lump chalk.....	do 1 1¼

CORDAGE.

Manilla cordage, ¼ in diam upward...	15
Manilla cordageless	15½
Manilla lath yarn..	14½
Manilla hay rope 2 and 3 ply.....	13½
Russia hemp tared cordage.....	13¼
Spun yarn.....	12½
Russia bolt rope.....	18
Houseline, Marline.	18½
Oakum.....10 50@	11 00
Pine tar..... 4 00	
Rosin, per bbl of 280 lbs..... 3 25	
Canvas, awnings and tents.....	

Hides and Leather.

Prime cured hides,	8½
Green hides.....	6½
Bull, scrubby, badly scored or damaged, cured, two-thirds price.	
Prime dry hides and Kip.....11	@12
Prime dry flint hides and Kip.....	@13
Damaged dry hides and Kip, two-thirds price.	
Horse hides, green No. 1 $	@2 00
Horse hides, dry.....2 00	@2 25
Prime cured veal calf, 8@15 lbs.....	14
Prime dry veal calf....	14
Prime dairy calf, salted (Deacon Skins)..... 75	@
Winter Kip, same as hides	
Pelts, wool estimated as washed..... .25	@1.25
Rough leather, prime .26	@27

GROCERIES.

Coffee.

Rio green..... 12	@ 17
Java " 21	@ 26
Roasted..... 14½	@ 16½
Ariosa.....	@ 16½

New Teas.

IMPERIAL.

Common..... 30	@ 40
Choicest..... 50	@ 60

YOUNG HYSON.

Common..... 20	@ 25
Fine..... 30	@ 35
Extra fine..... 40	@ 45
Choice..... 50	@ 55
Choicest..... 70	@ 75

GUN POWDER.

Fine..... 25	@ 35
Extra fine..... 40	@ 50
Finest..... 70	@ 80
Choicest..... 80	@ 85

OOLONG.

Common..... 20	@ 25
Fine..... 25	@ 30
Extra Fine..... 45	@ 50
Choice..... 60	@ 75
Choicest..... 80	@ 90

JAPAN UNCOLORED.

Fine..... 20	@ 25
Extra Fine..... 30	@ 35
Finest..... 40	@ 45
Choice..... 50	@ 60

Crushed Sugars.

Cut Loaf,	11⅛ @ 11¼
Powdered.....	11 @ 11¼
granulated.....	11 @
Standard A.....	9¾ @ 10
Coffee extra B	9¼ @ 9⅝
Coffee extra C	8¾ @ 9¼
Scotch refined.....	
C Coffee.....	8½ @ 9
Yellow C.....	8 @ 8¾
Molasses, refined...	7½ @ 8

Soaps.

Cleveland chemical	3¼@4
Bell's ¼ lb pressed cakes.....	4 85@
Lautz do do	5 00@
Thompson's ¼ do	4 75@
O K soap.....	3¾@
Babbitt's ¼ lb cakes	5 50@
do N Y city	4 75@
Olive Soap.....	4¾@
Dobbins.....	9 @
Thompsons standard	7½@
Bell's ¼ lb cake laundry.....	4 85@
Castile, American..	9 @ 10
do foreign mottled.	10 @ 11
do white.....	15 @ 18

Jellies.

4 oz tumbler currant..	@87½
Case Jelly.....	@1 75
Large Goblet.....	@2 10

Wooden Ware

TUBS.

Extra 3 hoop oak grained, per doz.	10 25
No 1, 3 do.....	8 50
No 2, 3 do.....	8 25
No 2, 2do.....	7 50
No 3, 2 do.....	6 50

PAILS.

Dairy, extra small china fin. per doz.	0 00
do 3 hoop do do	3 00
Common, 2 hoop, oak, grained do...	1 75
do 3 do do....	2 00
Half do 2 do do.....	1 75
Army, iron pails, flush bottom.....	3 50
Horse, wire do.....	3 50

Wash Boards.

Globe washboards per doz.....	2 50
Star.....	1 85
Eagle.....	1 75
Diadem, per doz....	85